





Water cycle

The water cycle starts when water in rivers, streams, lakes, in the ground, etc. evaporates under the Sun's heat. As the water vapor rises up into the air, it starts cooling down due to lower temperature, and forms tiny water droplets, followed by formation of clouds. These clouds gradually get heavy, then water droplets fall in the form of rain. The rain drops flow into rivers, streams, lakes, the ground, etc. and the process continues.

Water cycle provides clean water (self-cleaning during evaporation) and moderates average temperature.



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Water vapor

Water vapor is a mass of very small drops of water which float in the air because it is heated.



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Cloud

Water vapor rises up under effect of low temperature, condenses into a visible mass in the sky that forms from small water droplets or ice particles.





Rain

The higher clouds float in the sky, the colder it gets. Many small water particles form bigger drops, gradually become heavy enough to fall under gravity and become small drops. This phenomenon is called rain.

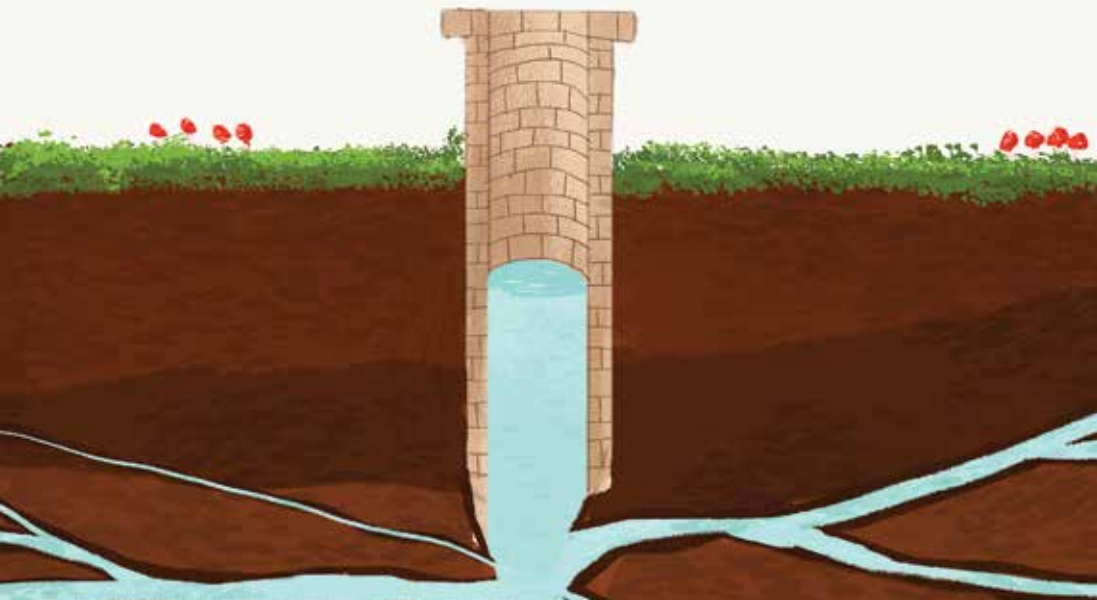


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Freshwater

The Earth's surface is covered by approximately 75% of water, but only about 2.6% of that is freshwater, the remaining is saltwater.

However, most of fresh water is stored in the form of glaciers in North - South Pole and ice caps; the rest resides in ponds, lakes, rivers, streams and underground. Only a very small amount of water all over the world is drinkable.



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Groundwater

Groundwater is water that exists underground. It is an essential water resource for human activities, and often exploited through water wells.

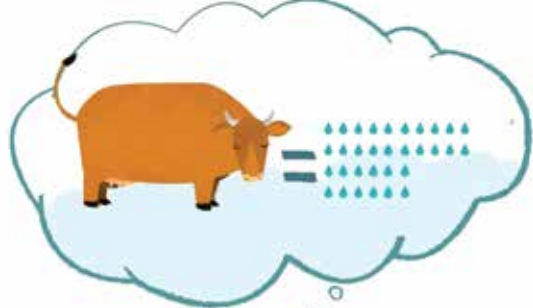




Saltwater

Water accounts for about 75% of the Earth's surface, in which 97.4% is saltwater in seas and oceans.

Saltwater contains a high concentration of salt. People can neither drink saltwater directly nor water plants with saltwater.





Water footprint

Water footprint is the total volume of freshwater used in life activities or productions, including the amount of water used directly and indirectly for that activities.

E.g. In the U.S., the water footprint of 1kg of beef is 15,500 liters of water (including water for food production, drinking and sanitary for cows).



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Water is life

Water plays an important role in our life. Water makes up a significant portion of human body, animals and plants:

- Water accounts for about 70% of human body weight, 50 - 90% of weight of other living creatures.
- Water is vital to metabolism, body temperature regulating and detoxification.
- Water is also home to many species and takes an active role in dispersal of creatures.





Water for life activities

Water is necessary for daily activities such as brushing teeth, washing face, cooking, bathing, washing clothes, dishes, cars, watering plants, etc.

According to the United Nations Water's statistics, 10% of globally consumed freshwater was for domestic use daily.

(Source: United Nations Water, 2016. Water and Sustainable Development Report 8/9/2015)



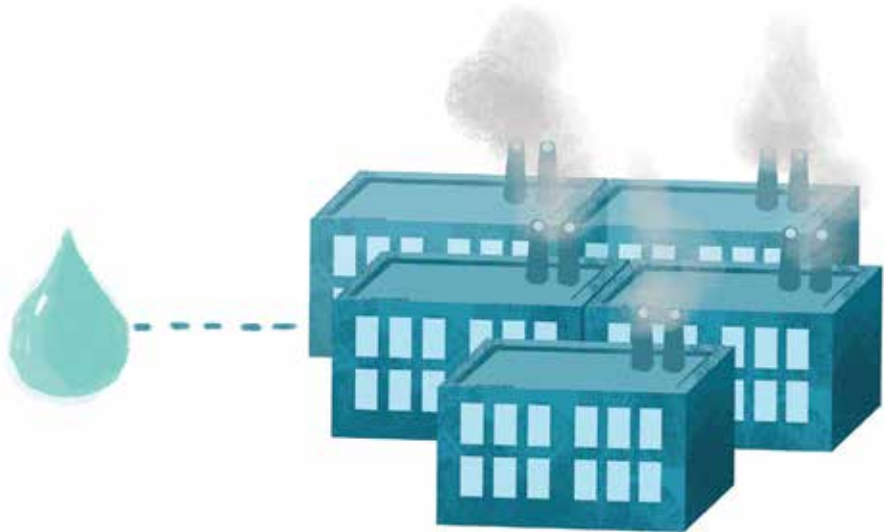


Water for agricultural activities

There is an old Vietnamese saying: “First water, second fertilizers, third care, fourth plant species”, which shows the important role of water in agriculture.

According to the United Nations Water’s statistics, water used for agriculture purposes accounted for 70% of total global freshwater consumption.

(Source: United Nations Water, 2016. Water and Sustainable Development Report 8/9/2015)





Water for industrial activities

The United Nations Water estimated that 20% of all consumed water was used in industrial activities, such as cooling machinery, a material for productions, a source of energy for power plants, etc.

(Source: United Nations Water, 2016. Water and Sustainable Development Report 8/9/2015)



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Water for recreational activities

Water can be used in recreational activities such as boating, sea bathing, swimming, etc.



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Water pollution

Water pollution occurs due to the presence of harmful substances (often chemicals or microorganisms), which leads to degradation of water quality, adversely affecting human health and the surrounding environment.

Water is polluted by both nature (volcanic eruptions, floods, hurricanes, decomposition of dead organisms, etc.) and human activities (industrial, agricultural activities, domestic wastewater discharge, etc.)



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Water scarcity

Currently, many places in the world usually do not have adequate water to supply people's needs.

According to the United Nations Water's statistics, approximately 4 billion people (almost two-thirds of the world's population) face severe water scarcity for at least one month every year. It is projected that by 2030 the number of people forced to move away from current resident place will have increased to 700 million.

Vietnam is one of the countries affected by water shortage and will face many challenges regarding water resources in near future.





Drought

Drought occurs when water in an area becomes scarce for a long time. Drought is triggered not only by the lack of precipitation but also loss of water retention of the soil resulting from deforestation.

Drought threatens our lives as well as production activities of human.





Flood

Floods can occur when water level and water flow velocity in rivers, streams exceed normal level.

Flooding is a phenomenon as an overflow of water from rivers, streams, lakes and dams, which consequently submerges houses, trees and fields.



FRESHWATER LAKE

SEA

FRESHWATER ZONE
BRACKISH WATER ZONE
SALTWATER ZONE



Saltwater intrusion

Saltwater intrusion is the movement of saltwater from sea into mainland, affecting the growth and development of plants and livestock.





Eyesore

Water shortage and contaminated water creates good condition for viruses, bacteria or other pathogens to grow and spread, including viruses or bacteria that cause eye-related diseases, especially conjunctivitis, also known as pink eye.



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Poisoning

Bacteria, organic compounds from products such as pesticide, insecticides, herbicides, plant growth regulators, food preservatives... that intrude into water can poison users.





Diarrhea

The consumption of water or products grown in contaminated water environment is the major cause of diarrhea.

According to the World Health Organization (WHO), diarrhea is one of the leading causes of mortality among children under the age of 5 and a cause of malnutrition as well.





Worm infection

Harmful microorganisms in water such as bacteria, viruses, parasites from feces of human or animal, cause human intestinal and digestive problems.



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Cancer

Some heavy metals found in water are essential for organisms and humans such as iron, zinc, manganese, potassium... However, humans as well as organisms require very small amounts of these elements. Absorbing too much these substances can lead to cancer and other deadly diseases.

Some other elements that cause negative effects on human health (if excess) are mercury, lead, arsenic...



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Improper waste disposal

Garbage, untreated domestic wastewater from residential areas are discharged into rivers, lakes, canals; which pollutes water resources.



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Toxic chemicals use in agriculture

Crop protection chemicals and chemical fertilizers are utilized in agriculture with the aim of killing pests and increasing crop yield.

However, the improper and excessive use of chemical fertilizers, plant hormones, herbicide, insecticide... releases toxic substances into water, followed by the pollution of water sources.

E.g. Spraying fertilizer at the wrong moment, applying excess amount of pesticide and disposing of packages improperly (at the edge of fields, river, stream bank...).



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Low environmental awareness in livestock and poultry production

Households raising livestock and poultry are unaware of saving and protecting public water sources. Many households don't have animal waste management systems, mostly dispose waste directly into ponds, rivers and streams or a self-destruction tank instead, and it is absorbed into the soil.





Oil spills

Oil spills happen when oil from the tankers, vessels or pipelines, oil rigs and oil fields is released into the environment due to technical incidents, natural disasters or other human activities.

Oil spills take a toll on the ecosystem, cause adverse effect on economic activities by sending a huge setback to exploitation of aquatic resources, polluting the water environment and posing great threats to human health.

(Source: Prime Minister 2013. Decision No. 02/2013/QĐ-TT for oil spill response operations)



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Deforestation

Forests have thick layers of humus, ground debris, and the potential ability to retain a large amount of rain. As a natural reservoir, forests store water in wet season and provide water to rivers in dry season.

Deforestation decreases water retention ability of the soil. This considerably increases the rate of soil erosion and can result in flash floods and severe floods.



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Effects of hydropower

Hydropower plants build dams that alter the natural flow of rivers, which can cause water shortages in dry season and severe flooding during rainy season in certain places. Hydroelectric power plants that change flow of rivers entirely can cause even more noticeable effects.

For example, the Dak Mi 4 hydropower plant in Quang Nam built on Dak Mi river has transferred millions of cubic meters of water from this river to Thu Bon river. This reduces flow rate of Vu Gia River, makes Da Nang residents in the downstream face water shortage.



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Wastage of water

Wastage of water is an unreasonable use of water, or that amount is lost because of excess usage.

E.g. Let the faucet run while brushing teeth, or let the showers flow continuously while showering/soaping... This is one of the reasons why freshwater supply is depleted.



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Climate change

Climate change causes changes in temperature, precipitation,... potentially followed by severe flooding in wet season and fierce drought in dry season.

Climate change is also attributed to sea-level rise and saltwater intrusion, which decreases freshwater storage in the aquifers.



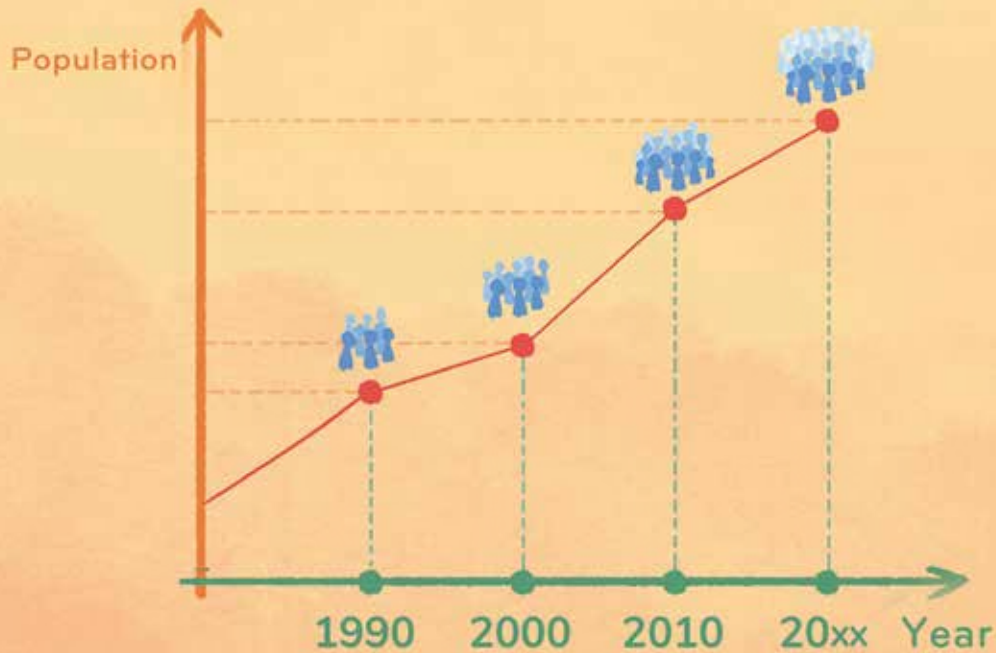
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Untreated solid waste, wastewater

The wastewater and solid waste treatment is complicated and requires a lot of money. Therefore, many factories discharge waste directly into ponds, rivers, and sea... or bury waste in the ground illegally, which results in severe water pollution.

Studies have shown that approximately 30 million hectares of worldwide agricultural land are severely affected by direct waste discharge. Most of these areas are downstream of the river. Hence, about 885 million people have faced severe health problems.

(Source: United Nations Environment 2017. Untreated wastewater – a growing danger)



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Population growth

Population growth puts pressure on water supply because people need a lot of water every day. On the other hand, the increase in consumer demand for foods, goods, recreational activities... leads to the increasing amount of solid waste and wastewater discharged into the environment.



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Restriction of the use of plastic bags

Plastic bags are thrown everywhere in landfills, lakes or seas. It takes a plastic bag around 500 -1000 years to degrade. This puts animals and humans at risk. We need to say “no” to plastic bags by:

- Refusing to take plastic bags when going shopping;
- Bringing cloth tote bags or shopping baskets when going to market;
- Reusing plastic bags when possible.





Collecting rainwater

Storing and using rainwater for watering plants, washing cars or cleaning. Rainwater after treatment can also be used to wash food, cook or drink like tap and well water.



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Dispose of garbage properly

We can protect water resources by:

- not littering;
- not dumping harmful substances, fertilizers, pesticides... into water resources, and disposing of them properly according to the instructions.





Utilizing water

We can reuse water after washing vegetables or rinsing rice to water plants, or cleaning with water from the last turn of rinsing clothes by hand...





Planting trees and forest

Forests regulate stream flows and groundwater levels. Forests slow down the speed of water flows, restrain abrupt emergence and severe effects of floods.

Water that penetrates forest soil is both a source of water storage for plants and soil organisms, and it flows slowly to the rivers in order to maintain the flow in dry season. Therefore, the frequency of natural disasters including drought and flooding decreases in areas with large forest coverage. Especially forests near river source play even more important role in regulation of flows.





Saving water

There are many ways to save water:

- Turn off the faucet when brushing teeth, washing face, hands;
- Use enough water to wash clothes, food, wash dishes and clean house;
- Use a dual-mode flush toilet;
- Take a shower instead of a bath;
- Reduce shower time, maximum within 10 minutes.





Keep toilets clean

Cleaning toilet regularly, cleaning sewer lines, removing sources of waste stagnation (water gutters, drains, trash cans, feeders, spare tires, jars...) in the neighborhood is a way to reduce the risk of some diseases.



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Wastewater treatment

Wastewater management companies, treatment plants are supposed to apply scientific achievements and advance technologies to domestic and industrial wastewater treatment before discharging into lakes, rivers, streams, ...

Besides, individuals should be aware of serious consequences of untreated sewage discharge into the environment.



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Using natural cleaning products

Reduce the use of detergents, chemicals that contain toxic substances and micro plastic. Use natural soap, body wash, shampoo and detergent instead, e.g., products made from Chumket Bean, Reetha, recycled soap, lemon juice, ...



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Checking plumbing periodically

Check household plumbing regularly (shower faucets, toilet, water supply pipes...) to prevent water leaks.





Growing drought-tolerant plants

Growing drought-tolerant plants helps farmers keep producing under conditions of severe hot weather and water shortage, which partly balances locals' life.



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Sharing information

Share and convince friends, family and people around us to save and use water resources economically.